

## ECOLOGICAL AND ECONOMIC CONVERGENCE OF REGIONAL DEVELOPMENT

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Effective implementation of environmental and economic policy at the regional level involves the provision of significant power to local authorities and NGOs. In particular, it is necessary to estimate processes of ecological and economic convergence regions in order to develop effective influence measures. To our opinion, it is very crucial to development the ideas of sustainable development in view of convergence within economic, social and environmental areas. Under the ecological and economic convergence of regions we understood the alignment of economic and environmental potentials, based on the redistribution of financial resources to promote sustainable development.

Aligning environmental and economic potentials of regional development could be done only due to external intervention, for example, regional development program in economically weak regions. In our view, the ecological-economic convergence is fully consistent with the goals of sustainable development, since significant territorial disparities of regional development are not associated with sustainable development.

The principal motto of sustainable development: "Think globally – act locally" does not exclude the trend of regional decentralization. Effective regional development is possible only under the financial and economic independence of the territories, and achieved through instruments promoting environmental-economic convergence. The sustainable development within a country is a balance of social, environmental and economic performance of individual regions, which determines the stability and balance of the entire national economy. We believe that a necessary but not sufficient condition for sustainable development is to balance socio-ecological and economic potential of regions.

It is difficult to develop the concept of sustainable development, where some regions prosper and other others are in decline. In economic theory it is believed that in the long run, regions within a country must reach a certain level of equilibrium state (steady state) in the economic, environmental and social fields. The possibility of achieving an equilibrium state means that the regions with less economic potential must develop their economies more rapidly to match the leaders. Similarly, should change and quality of life. Convergence does not mean the same structure of production, landscapes, social infrastructure, however it is expected to align the quality of life of the population and environment.

Within a single country the process of economic convergence of regions is estimated as follows

$$y_{it} = e^{-\beta_0 \tau} y_{it-1} + (1 - e^{-\beta_1 \tau}) y_{it}^* + u_{it} \quad , \quad (1)$$

where  $y_{it}$  – per capita income in the  $i$ -th region in the  $t$ -th year;

$e$  – base of natural logarithms;

$u_{it}$  – standard deviation of regression (error term);

$\beta_0$  – parameters to be evaluated.

Taking the logarithm and performing the linearization of relation (1), we obtain an equation which can estimate the package of applied economic programs such as Stata and Matlab.

Linearized equations (2) considers only the influence of basic indicators (economic growth, the level of pollution), and allows to ignore the less relevant factors:

$$\ln(y_{i,T}/y_{i,0}) = \beta_0 + \beta_1 \ln(y_{i,0}) + u_i \quad , \quad (2)$$

where the indices respectively means, the final period (T), and the initial (0, null).

From equation (2), we find that if  $\beta_1 < 0$ , economic ( $\beta$ ) convergence is present, initially rich regions increase more slowly, and vice versa. Otherwise, when  $\beta_1 > 0$  convergence is absent and the regions that initially had greater economic potential, develop more quickly. Initially depressed regions are behind the leaders, both in absolute and relative terms.

Models such as "logarithm – logarithm" are widely used in economic modelling, as they allow easy interpretation. The obtained results of the "log-log" model are treated in the form of elasticity. Thus, affecting factors show the percentage change in the dependent variable (growth rate of real per capita income or rate of growth of emissions for environmental convergence) due to the dependent variable change by one percent.

From the perspective of sustainable development, economic and ecological convergence of territorial units contributes to a balanced socio-ecological-economic growth. The carried out research for the Ukraine, shows that over time rich regions are equilibrate with poor both in absolute and relative terms. The model of economic convergence can be used to estimate the effectiveness of administrative and financial mechanisms for balancing the economic development of regions of Ukraine.

However, the study revealed the lack of ecological equilibrium of the regions. The lack of direct links between the initial and future values of pollution across regions is also confirmed by statistical data. In particular, in order to align the environmental capacity of regions of the country, we recommend that economically strong territories spend more financial resources to improve the quality of the environment.